

NREL 98-21

Claims

- Sub. A1* → 1 A process for removing phenols from an aqueous solution comprising the steps of:
- 5 (a) contacting a mixture comprising the solution and a metal oxide;
- (b) forming a phenol compound metal oxide complex; and
- (c) removing the phenol metal oxide complex from the mixture.
2. The process of claim 1 wherein the metal oxide is selected from the group consisting of titanium dioxide, vanadium oxide, and zirconium oxide.
3. The process of claim 1 wherein the phenolic compound is lignin or biomass-derived.
- 10 4. The process of claim 1 further comprising adjusting the mixture to a pH greater than 7.0 after contacting.
- Sub. B2* → 5. The process of claim 1 wherein the metal oxide is selected from the group consisting of manganese dioxide, silicon dioxide, and aluminum oxide, and further comprising adjusting the mixture to a pH in the range of 1.5-11 after contacting.
- Sub. A2* → 15 6. The process of claim 1 further comprising regenerating the metal oxide after removing the phenol metal oxide complex from the mixture.
7. The process of claim 1 wherein the solution is a biomass hydrolyzate and the phenols are biomass-derived.
8. The process of claim 6 wherein regenerating comprises heating in the presence of
- 20 oxygen.